



VOLVO'S NEW FAMILY OF AWD SPORTWAGONS: SURE-FOOTEDNESS IS ADDED TO AN ALREADY VERSATILE PLATFORM

Volvo's sets its sights squarely on the SUV market with the North American debut of the V70 All-wheel-Drive Sportswagon family of vehicles. Combining all-wheel drive technology with the award-winning V70 platform has created a level of safety engineering, comfort, and driving pleasure not found on any Sport Utility Vehicle, mini-van or conventional front wheel drive vehicle.

It is on this versatile V70 platform that Volvo created three different variations of all-wheel-drive wagons, with engine options ranging from a light-pressure turbocharger to a high-pressure turbocharger. The V70 AWD, V70 XC AWD are fitted with the light-pressure turbo while the Volvo V70 R AWD has the high output, high-pressure turbo engine. This trio of AWDs are versatile wagons that excel in traction, road handling, comfort and cargo carrying, and uniqueness.

Elegant Simplicity

The V70 AWD's behave like a conventional front-drive vehicle on dry roads. But when road conditions deteriorate or become slippery, Volvo's AWD system automatically switches into four-wheel drive without the driver having to shift levers or push buttons.

The Volvo engineering and design philosophy has always dictated that any new feature or technology is only of value if it does not complicate the driving experience. So engineers have designed a simple, user-friendly AWD system that makes driving more sure-footed and safer under most adverse road or weather conditions. It automatically makes traction transfer decisions so quickly that a driver never needs to think about selecting either 2 wheel drive or all-wheel drive models. Volvo's AWD wagons combine

the single most desirable feature of an SUV, take-off traction, with superior ride, handling, comfort, safety engineering, performance and fuel economy.

How Volvo's AWD Works

Engine power can be diverted to rear wheels through a transfer differential located adjacent to the transmission. Power can be split to either the front or rear wheels in varying amounts as road conditions dictate and without driver intervention.

Further downstream in the driveline resides the main component that handles engine power transfer, the viscous clutch. In simple terms it is a type of turbine in which power that normally drives the front wheels is instantly transferred to the rear wheels to help maintain optimum vehicle traction. It is the key to Volvo's AWD system.

The viscous clutch normally allows 95 percent of the engine power to remain directed to the front wheels and five percent to the rear wheels under conventional driving conditions. But as soon as a wheel slip is detected, the viscous clutch adjusts torque distribution to all wheels and when necessary, can transfer up to 95 percent of the engine power to the rear wheels. This all takes place in milliseconds--well before a driver would be capable of making such a decision. No special technical or driving skills are required to operate the all-wheel drive mode. The entire action is completely transparent to the driver. In fact, the action is similar to what occurs in an automatic transmission.

System Mechanics:

Transfer Differential

Volvo's transmission has been modified and extended to include a compact transfer differential. The power is transferred between the transmission's differential housing and bevel gear's tubular shaft via a splined joint. The bevel gear's wheel and pinion and the final drive have the same numerical ratio between the front and rear wheel. At the rear edge of the transfer differential there is a drive shaft which leads to the rear wheels. This shaft has CV joints at the front

and rear and a U -joint in the center, where the intermediate bearing is situated. The drive shaft runs through the standard floor tunnel which permits the installation of the system with only a few minor modifications.

Viscous Coupling

The viscous coupling, which is located ahead of the rear differential, appears as a long tube filled with silicone oil and contains a large number of discs. The viscous clutch is designed to use the silicon oil's viscosity to transfer power via the discs to the rear wheels when the front wheels start to spin. Every other disc is connected to the front wheel part of the shaft and the alternating discs are connected to the rear differential. When the discs revolve at a different rate the silicone oil in which the discs rotate becomes more viscous and thus increases the pressure. As this pressure increases, torque is transferred to the rear wheels.

If the viscous coupling is subjected to intensive slipping, the silicone oil and discs become very hot. At this point, the coupling locks-up to prevent any slippage.

Freewheel Unit

Volvo has also engineered into the drive line system a freewheel component. This unit disengages the rear drive during braking and/or coasting help ensure optimum braking performance. With this feature, the ABS braking system does not need modification. Another refinement, when it comes to this freewheel, is that it also has a lock-up function. This means that Volvo's AWD system is always in four-wheel driven when it reverses.

Rear Drive Unit

The rear drive unit is similar to the one used for the S90/V90 series, but uses coil springs rather than a mono-leaf composite spring. The choice of this unit, rather than engineering a completely new one, is a clever bit of engineering. The

drive unit was fitted with minor modifications, required virtually no re-engineering, and created only minor changes in manufacturing, which means that all the good characteristics S90/V90 are transplanted into this vehicle. And this also turns out to be a very cost effective solution to a potentially tricky problem.

The axle housing assembly consists of two sections of cast aluminum bolted together. This assembly houses the drive unit and Multi-link rear suspension, shock absorbers, and anti-roll bar. This independent rear suspension unit mounts into the V70 chassis without major modifications or loss of interior cargo space. The rear drive unit delivers a high degree of rear wheel traction while providing excellent road noise isolation, passenger comfort, and driving pleasure.

Front And Rear Traction Control

Volvo engineers have also incorporated a locking differential for the rear axle drive unit, and Traction Control System (TRACS) for the front drive unit to help ensure that the correct amount of power is distributed as needed at low speeds.

The locking rear differential senses minute differences in rear wheels rotational speed and at speeds less than 25 mph automatically locks both rear wheels to transfer engine power to help maintain traction. TRACS, based on an ABS feed back system, is designed to work at speeds of less than 25 mph and is especially useful in helping to prevent front wheel spin at vehicle launch.

Both these systems, locking rear differential and front wheel TRACS, working together help to prevent wheel spin, thereby helping to ensure maximum take-off traction control on most slippery road surfaces.

Ground Clearance And Ride Height

Ground clearance difference between Volvo's V70 and the V70 XC is about 1 inch for a total of 6.5 inches clearance at the vehicle's lowest point. Ground clearance

between the V70 AWD and V70 R AWD as compared to non-AWD V70s is virtually identical. While the mission of the XC is to help provide optimum traction on loose road surfaces during highway and dirt/gravel travel, the 6.5 inches of clearance is quite respectable when comparing it to most SUVs and is surprisingly good for a passenger wagon. While consideration for ground clearance is important for off road vehicles, many in fact have ground clearances only slightly higher than the XC.

Vehicle height between models varies. All non-AWD V70 share the same ride height of 56.2 inches. The V70 AWD and V70 R AWD also share the same 57.2 inches height. The V70 XC AWD is slightly 2 inches higher than its non-AWD cousins with a total of 58.3 inches of vehicle height.

An Intelligent Alternative

The overall result of this design is an intelligent AWD system that provides a conventional front-drive with all its responsiveness and advantages. But when driving conditions suddenly change, the V70 AWD wagon is transformed into a four-wheel drive vehicle with the traction advantage of a SUV. All without the inherited discomforts normally associated with traditional truck-like 4X4s.

Volvo will only offer AWD in all of the V70 Sportswagon-based models only with automatic transmission. The V70 AWD and the V70 XC come with a 190 hp five cylinder engine with a light-pressure turbocharger that can zip the vehicle from 0-60 mph in 8.6 seconds. Top speed is electronically limited to 127 mph. As used in S70 and V70 T5, the V70 R AWD, is equipped with the high pressure B5234T turbocharged engine which has an 8.5:1 compression ratio. This power plant produces 236 horsepower at 5100 rpm and 243 lb.-ft. of torque at 2100 rpm. As with all front wheel drive Volvos, despite it's speed and acceleration, the V70 AWDs, are a virtually free of the characteristic torque steer that often mars the enjoyment of some front-drive cars.

The driver of any member of the V70 AWD family of cars will experience a level of stability, sporty handling, safety engineering, control, fuel economy, and comfort that no truck-based sports utility vehicle can match and that conventional front-drive cars are unable to provide.

The V70 AWD went on sale in July of 1997. The V70 R AWD goes on sale in August, and the V70 XC AWD in October of 1997. Price will start at \$34,420. Volvo will not offer AWD in either the S70 sedan or C70 coupe.

VOLVO

1998 SPECIFICATIONS

V70 AWD (Wagon)

Manufactured at: Torslanda, Sweden

ENGINE-B5254 T

Type In-Line 5-Cylinder	
HP (SAE NET)	190 @ 5,200 rpm
Torque	199 lb/ft. @ 1,800 rpm
Cylinder Block	Die-Cast Aluminum
Cylinder Head	Die-Cast Aluminum
Bore & Stroke	83mm x 90mm
Displacement	2,473 cc
Compression Ratio	10.5:1
Fuel Requirements	87 Minimum 91 Optimum
Engine Management	Motronic 4.4
Main Bearings	6-Shell Type
Valve Train	DOHC 20 valves
Valve Operations	Hydraulic Tappets
Battery/Alternator	520/80 AMP
Crankcase Capacity	6.1 US Qt's. (Inc. Filter)
Fuel Tank Capacity	(70 L) 18.3 US Gallons

DRIVETRAIN**Transmissions: AW50-42 (modified)**

Automatic = 3.61:1, 2.06:1, 1.37:1, 0.98:1, Final Drive 2.56:1, Reverse 2.99:1

Body/Chassis:

Pressed Steel Unit Body

Suspension:**Front;** MacPherson Hydraulic Struts With Asymmetrically Mounted Coil Springs and 20.5mm Stabilizer Bar**Rear;** Volvo Patented Multi-link, Fully-Independent Suspension With Coil Springs, Nivomat Self-leveling Shock Absorbers .**Steering:**Power Assisted Rack and Pinion
Ratio: 16.8:1
Turns Lock To Lock: 3.1
Turning Circle: 37.7 Ft.**Brakes:**Four Wheel Disc With Vacuum Assist, ATE 3-Channel ABS, Mark 20
Front-Vented Disc 11.0"
Rear-Solid Disc 11.5"
Drum Type Parking Brake, Mechanical Operation**Wheels/Tires:**6.5" x 16" Five Spoke Alloy Wheels
205/55/16 XGTV4 Michelin All-Season Tires**DIMENSIONS & CAPACITIES**

Wheel Base	104.3"
Track Front	59.8"
Track Rear	58.7"
Overall Length	185.9"
Overall Width	69.3"
Overall Height	57.2"
Curb Weight	3,754 lbs
Ground Clearance	5.4"
Weight Distribution F/R (%)	56/44
Coefficient of drag (Cd)	0.32
Towing Load (lbs.)	3,300

Interior DimensionsHead Room Front (Sunroof) 38.4"
Head Room Rear (Sunroof) 37.9"**Interior Dimensions (cont.)**

Leg Room Front	41.4"
Leg Room Rear	35.2"
Shoulder Room Front	57.1"
Shoulder Room Rear	56.3"
Hip Room Front	55.2"
Hip Room Rear	55.2"

Cargo Capacity (Cu. Ft):

Seat Up	37.1
Seat Down	67.0

EPA Size Class: Midsize

Cu. Ft. 130.7

EPA Fuel Economy:

	<u>City</u>	<u>Hwy</u>
Automatic:	18	24

STANDARD EQUIPMENT

Driver And Passenger Side SRS
Side Impact Protection System (SIPS)
Side Impact Air Bag (Driver and Passenger Seats front)
TRACS (Low-Speed Traction Control System)
Electronic Climate Control With CFC Free A/C
Daytime Running Light System
Head Lamp Wiper/Washer System
Rear Fog Light
Cruise Control
Digital Clock And Ambient Temperature Gauge
Trip Computer
Remote Keyless Entry/Security System
Two-Step Remote Keyless Entry W/Power Door Locks
ABS
3-Point Seat Belts And Head Restraints In All Five Seating Positions
Child Proof Rear Door Locks
P/Windows Drivers Auto Down/Central Locking
Heated Front Seats
8-Way Power Adjustable Driver's Seat W/3 Position Memory
Front Reclining Bucket Seats
Tilt And Fold Front Passenger Seat
Power Outside Mirrors, Heated
SC 813 Premium Sound System AM/FM Stereo Full Logic
Cassette, 4x25 Watt Amp. W/CD Compatibility and Anti-Theft, 6-Speakers
Integrated Window Antenna , Diversity Antennas
Tilt/Telescope Steering Column
Automatic Load Leveling
Solid Or Metallic Paint
Rear Mud Flaps

OPTIONAL EQUIPMENT

Power Passenger Seat
Rear Spoiler
Trip Computer
Power Glass Sunroof
Specifications and equipment are subject to change. 9.04.97

VOLVO

1998 SPECIFICATIONS

V70 R AWD (Wagon)

Manufactured at: Gent, Belgium

ENGINE-B5254 T

Type In-Line 5-Cylinder	
HP (SAE NET)	236 @ 5,100 rpm
Torque	243 lb/ft. @ 2,700 rpm
Cylinder Block	Die-Cast Aluminum
Cylinder Head	Die-Cast Aluminum
Bore & Stroke	81mm x 90mm
Displacement	2,319 cc
Compression Ratio	8.5:1
Fuel Requirements	87 Minimum 91 Optimum
Engine Management	Motronic 4.4
Main Bearings	6-Shell Type
Valve Train	DOHC 20 valves
Valve Operations	Hydraulic Tappets
Battery/Alternator	520/80 AMP
Crankcase Capacity	6.1 US Qt's. (Inc. Filter)
Fuel Tank Capacity	(70 L) 18.3 US Gallons

DRIVETRAIN

Transmissions: AW50-42 (modified)

Automatic = 3.61:1, 2.06:1, 1.37:1, 0.98:1, Final Drive
2.56:1, Reverse 2.99:1

Body/Chassis:

Pressed Steel Unit Body

Suspension:

Front: MacPherson Hydraulic Struts With Asymmetrically
Mounted Coil Springs and 20.5mm Stabilizer Bar

Rear: Volvo Patented Multi-link, Fully-Independent
Suspension With Coil Springs, Nivomat Self-leveling Shock
Absorbers .

Steering:

Power Assisted Rack and Pinion
Ratio: 16.8:1
Turns Lock To Lock: 3.1
Turning Circle: 37.7 Ft.

Brakes:

Four Wheel Disc With Vacuum Assist, ATE 3-Channel
ABS, Mark 20

Front-Vented Disc 11.0"

Rear-Solid Disc 11.5"

Drum Type Parking Brake, Mechanical Operation

Wheels/Tires:

7" x 16" Alloy Wheels

205/55/16 XGTV4 Michelin Pilot High Performance Tires

DIMENSIONS & CAPACITIES

Wheel Base	104.8"
Track Front	59.8"
Track Rear	58.7"
Overall Length	185.9"
Overall Width	69.3"
Overall Height	57.2"
Curb Weight	3,788 lbs
Ground Clearance	5.4"
Weight Distribution F/R (%)	56/44
Coefficient of drag (Cd)	0.32
Towing Load (lbs.)	3,300

Interior Dimensions:

Head Room Front (Sunroof)	38.4"
Head Room Rear (Sunroof)	37.9"
Leg Room Front	41.4"
Leg Room Rear	35.2"
Shoulder Room Front	57.1"
Shoulder Room Rear	56.3"
Hip Room Front	55.2"
Hip Room Rear	55.2"

Cargo Capacity (Cu. Ft):

Seat Up	37.1
Seat Down	67.0

EPA Size Class: Midsize

Cu. Ft.	130.7
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EPA Fuel Economy:

	<u>City</u>	<u>Hwy</u>
Automatic:	18	25

STANDARD EQUIPMENT

Driver And Passenger Side SRS
Side Impact Protection System (SIPS)
Side Impact Air Bag (Driver and Passenger Seats front)
TRACS (Low-Speed Traction Control System)
Electronic Climate Control With CFC Free A/C
Daytime Running Light System
Head Lamp Wiper/Washer System
Rear Fog Light
Cruise Control
Digital Clock And Ambient Temperature Gauge
Remote Keyless Entry/Security System
Two-Step Remote Keyless Entry W/Power Door Locks
ABS
3-Point Seat Belts And Head Restraints In All Five Seating
Positions
Child Proof Rear Door Locks
Power Glass Sunroof, W/Tilt and Slide, W/Sunshade
Retractable Rear Seat Mounted Cargo Net
Cobalt Blue Instrument Panel Back Lighting
Trip Computer
Fog Lights
P/Windows Drivers Auto Down/Central Locking
Heated Front Seats
8-Way Power Adjustable Driver's Seat W/3 Position Memory
8-Way Power Adjustable Passenger's Seat
Textured Aluminum Alloy Instrument Panel Inserts
Leather/Alcantara® Diamond Pattern With High Side Bolsters
Front Reclining Bucket Seats
Tilt And Fold Front Passenger Seat
Power Outside Mirrors, Heated
SC 900 3-CD Premium Sound System AM/FM Stereo Full Logic
Cassette, 200 Watt Amp. and Anti-Theft, 8-Speakers
Integrated Window Antenna, Diversity Antennas
Leather/Suede Steering Wheel
Tilt/Telescope Steering Column
Automatic Load Leveling
Paint Options: Black, Mystic Silver Metallic, Saffron
Rear Mud Flaps

OPTIONAL EQUIPMENT

Black-Stained Walnut Wood Trim (No Cost Replacement for
Alluminum Alloy Inserts)

Specifications and equipment are subject to change. 09.04.97

VOLVO**1998 SPECIFICATIONS****V70 XC AWD (Wagon)****Manufactured at: Gent, Belgium****ENGINE-B5254 T**

Type In-Line 5-Cylinder	
HP (SAE NET)	190 @ 5,200 rpm
Torque	199 lb/ft. @ 1,800 rpm
Cylinder Block	Die-Cast Aluminum
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Bore & Stroke	83mm x 90mm
Displacement	2,473 cc
Compression Ratio	10.5:1
Fuel Requirements	87 Minimum 91 Optimum
Engine Management	Motronic 4.4
Main Bearings	6-Shell Type
Valve Train	DOHC 20 valves
Valve Operations	Hydraulic Tappets
Battery/Alternator	520/80 AMP
Crankcase Capacity	6.1 US Qt's. (Inc. Filter)
Fuel Tank Capacity	(70 L) 18.3 US Gallons

DRIVE TRAIN**Transmissions: AW50-42 (modified)**

Automatic = 3.61:1, 2.06:1, 1.37:1, 0.98:1, Final Drive 2.56:1, Reverse 2.99:1

Body/Chassis:

Pressed Steel Unit Body

Suspension:**Front:** MacPherson Hydraulic Struts With Asymmetrically Mounted Coil Springs and 20.5mm Stabilizer Bar**Rear:** Volvo Patented Multi-link, Fully-Independent Suspension With Coil Springs, Nivomat Self-leveling Shock Absorbers .**Steering:**Power Assisted Rack and Pinion
Ratio: 16.8:1
Turns Lock To Lock: 3.1
Turning Circle: 37.7 Ft.**Brakes:**

Four Wheel Disc With Vacuum Assist, ATE 3-Channel ABS, Mark 20

Front-Vented Disc 11.0"

Rear-Solid Disc 11.5"

Drum Type Parking Brake, Mechanical Operation

Wheels/Tires:

6.5" x 15" Five Spoke Alloy Wheels

205/65/15 Continental Touring Contact All-Season Tires

DIMENSIONS & CAPACITIES

Wheel Base	104.8"
Track Front	59.8"
Track Rear	58.7"
Overall Length	185.9"
Overall Width	69.3"
Overall Height	58.3"
Curb Weight	3,768 lbs
Ground Clearance	6.5"
Weight Distribution F/R (%)	56/44
Coefficient of drag (Cd)	0.32
Towing Load (lbs.)	3,300
Interior Dimensions	
Head Room Front (Sunroof)	38.4"

Head Room Rear (Sunroof)	37.9"
Leg Room Front	41.4"
Leg Room Rear	35.2"
Shoulder Room Front	57.1"
Shoulder Room Rear	56.3"
Hip Room Front	55.2"
Hip Room Rear	55.2"

Cargo Capacity (Cu. Ft):

Seat Up	37.1
Seat Down	67.0

EPA Size Class: Midsize

Cu. Ft.	130.7
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EPA Fuel Economy:

	<u>City</u>	<u>Hwy</u>
Automatic:	18	24

STANDARD EQUIPMENT

Driver And Passenger Side SRS
Side Impact Protection System (SIPS)
Side Impact Air Bag (Driver and Passenger Seats front)
TRACS (Low-Speed Traction Control System)
Electronic Climate Control With CFC Free A/C
Daytime Running Light System
Head Lamp Wiper/Washer System
Rear Fog Light
Cruise Control
Digital Clock And Ambient Temperature Gauge
Trip Computer
Remote Keyless Entry/Security System
Two-Step Remote Keyless Entry W/Power Door Locks
ABS
3-Point Seat Belts And Head Restraints In All Five Seating Positions
Child Proof Rear Door Locks
Power Glass Sunroof, W/Tilt and Slide, W/Sunshade
P/Windows Drivers Auto Down/Central Locking
Heated Front Seats
8-Way Power Adjustable Driver's Seat W/3 Position Memory
8-Way Power Adjustable Passenger Seat
Front Reclining Bucket Seats
Tilt And Fold Front Passenger Seat
Leather/Twill Cloth
Leather Steering Wheel
Power Outside Mirrors, Heated
SC 816 Premium Sound System CD Player, AM/FM Stereo Full Logic Cassette, 4x25 Watt Amp. W/Remote CD Compatibility and Anti-Theft, 6-Speakers
Integrated Window Antenna , Diversity Antennas
Tilt/Telescope Steering Column
Walnut Wood Dash Trim Center Console & Instrument Panel
Automatic Load Leveling
Roof Rails And Cross Bars
Fog Lights
Fold Out Rear Bumper Protection Mat
Cargo Area Side Nets
Solid Or Metallic Paint
Rear Mud Flaps

OPTIONAL EQUIPMENT

Leather Interior
Specifications and equipment are subject to change 09.04.97